

## Abstract

A multifunctional material having a carbon-doped titanium oxide layer, which has carbon doped in the state of Ti-C bonds, is excellent in durability (high hardness, scratch resistance, wear resistance, chemical resistance, heat resistance) and functions as a visible light responding photocatalyst, is provided. The multifunctional material of the present invention is obtained, for example, by heat-treating the surface of a substrate, which has at least a surface layer comprising titanium, a titanium alloy, a titanium alloy oxide, or titanium oxide, in a combustion gas atmosphere of a gas consisting essentially of a hydrocarbon such that the surface temperature of the substrate is 900 to 1,500°C; or by directly striking a combustion flame of a gas consisting essentially of a hydrocarbon, against the surface of the substrate for heat treatment such that the surface temperature of the substrate is 900 to 1,500°C.